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Effects of Message Polarity, Communication Orientation and Hierarchy on Organizational Media Choice

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Abstract

Organizational media choice refers to the decision process of choosing a particular medium to communicate within an organization. Media richness theory and social influence theory are two prevalent media choice theories in the literature. This study proposed two new factors, message polarity (whether the message is a good or bad news to the recipient) and communication orientation (the intentions of the communicator) in determining media choice. A third factor hierarchy which refers to the status difference between the communication parties was also investigated. The study adopted policy capturing as the design. Employees from various organizations in Hong Kong (N=178) responded to a series of communication scenarios and attitudinal items in a survey. Hierarchical Linear Modeling (HLM) was used as the analytical technique to deal the multilevel data structure. Results showed that employees were more likely to choose telephone, electronic mail and written medium when communicating positive messages. They were more likely to choose electronic mail and written medium when they were task-oriented. They were more likely to choose face-to-face and written medium for downward communication and telephone for horizontal communication. The results also supported the notion of using HLM for the current survey design. Failures to support some of the hypotheses and implications of the results were discussed.

撮要

組織媒體選擇 (Organizational Media Choice) 是指員工在組織內選擇特定媒體作溝通的決策過程。在過去研究文獻中，媒體豐富論 (Media Richness Theory) 及群眾影響論 (Social Influence Theory) 是兩個最具影響力的媒體選擇理論。本研究提出兩個新因素—訊息極性 (Message Polarity，簡指訊息對接收者而言是好消息或壞消息) 及溝通取向 (Communication Orientation，簡指溝通者的內在動機) 如何影響媒體選擇，而溝通與接收者之間的階級關係 (Hierarchy) 亦是本研究另一個探討的因素。本研究採用決策攫取 (Policy Capturing) 作為數據收集工具。來自香港不同機構的僱員(N=178)就問卷中一系列溝通情景及其他意見問題作出回應，由於所收集的數據具階層結構，故運用階層式線性模型 (Hierarchical Linear Modeling) 作統計分析。研究結果顯示，員工較大機會選擇電話、電郵及書寫媒體傳達正面訊息。當有要把事情準確辦妥的取向時，他們較大機會選擇電郵及書寫媒體作溝通。他們較大機會選擇面對面及書寫媒體向下級溝通，和同級同事溝通時則較大機會選擇用電話。研究亦證明階層式線性模型是處理本研究中階層式數據的有效工具。本文最後會討論研究結果的含義及只有部分假設成立的可能原因。

Effects of Message Polarity, Communication Orientation and Hierarchy on Organizational Media Choice

Communication is the process of information exchanges, updating and clarification of ideas. This is crucial to corporate success as the diversification of jobs is high nowadays. In an office setting, one of the important functions of communication is allowing constant updates of job progress so that employees can cooperate smoothly and minimize time wasted in doing unproductive work. Trevino, Daft and Lengel (1990) mentioned that approximately 80% of managers' time in work is spent on communication. It is intuitive to think of communication skills as a core competency required by many jobs.

The way of how people communicate obviously influences the communication outcomes. In terms of interpersonal communication within an organization, the decision of selecting a particular communication medium marks the first step in establishing exchanges. This process is generally termed as organizational media choice. Due to the different nature among communication media, it is assumed that choosing different media will have different communication consequences in terms of quality, efficiency and symbolic meaning. Kiesler and Sproull (1992) showed significant differences in communication styles and ways of arriving decisions between face-to-face and computer mediated communication groups. Thus it is important to study media choice in order to understand the processes and consequences of organizational communication.

This issue is complicated by the advances in information technology. Offices are now readily equipped with all kinds of communication devices. Telephone, fax machine, electronic mail and voice mail are easily accessible from every employee's desk in addition to the traditional channels such as face-to-face and written documents. The freedom in media choice may induce different communication styles

based on individual media preference and the results would be significant in affecting organizational performance. Daft, Lengel and Trevino (1987) tested the idea of media sensitivity and showed that managers who are more media sensitive, that is, they choose more appropriate media for different communication tasks, perform better. On the other hand, D'Ambra, Rice and O'Connor (1998) supported previous findings by showing that managers are generally biased towards face-to-face communication across tasks.

The purpose of this study is to propose and test determinants in affecting media choice that are not previously identified in the literature. Firstly, major theories on organizational media choice are briefly reviewed. And based on the past findings, it is concluded that existing theories tend to focus on physical and geographical determinants in explaining media choice and they may not be adequate to capture the complexity of the process in everyday organizational communication.

Media Choice Theories

Media Richness Theory.

Daft and Lengel (1984) proposed the theory of media choice based on the differences in "richness" among different communication media. A rich medium is one having high capacity of facilitating mutual understanding and resolving ambiguity between the communicator and the recipient. A lean medium has low capacity on these aspects. According to the scale suggested by Trevino et al. (1990), face-to-face is the richest medium, followed by telephone, electronic mail, letter, note, memo and special report. The leanest media are flier and bulletin. Richness of a medium is determined by 1) its bandwidth (modes of communication allowed, like non-verbal gestures, expressions and tones), 2) whether synchronous communication can be established, 3) the amount of information that is able to be passed per communication and 4) the ease for the recipient to reply.

Another key concept in the theory is concerning the equivocality of the message.

According to Trevino et al. (1990), "Equivocality means the existence of multiple and conflicting interpretations about an organizational situation." (p.74). Equivocality thus can be treated simply as the ambiguity of the message content. For example, decision making processes including evaluation and judgment of options are always highly equivocal, while data feedback is unequivocal. Based on the concepts of media richness and message equivocality, media choice is defined as a matching process by selecting the most suitable medium for the message allowing highest efficiency in reducing uncertainty. Communication efficiency should be optimal when this match is achieved. Adopting a rich medium for an unambiguous task would be wastage of time while choosing a lean medium for an ambiguous task would cause information loss and communication problems.

The theory assumes the communicators to be rational and the richness of different media is fixed across various tasks and organizations. In general, media richness theory receives considerable support from a number of empirical studies (e.g. Rice, 1993; Straub & Karahanna, 1998; Trevino & Webster, 1992).

Media Symbolism. In additional to the concepts of media richness and message equivocality, Trevino et al. (1990) added another factor as one of the determinants of media choice. It concerns the subjective norm formed for different communication channels in an organization. Based on the theories from sociology and social psychology, the authors argued that merely adopting a particular medium might already induce a meaning to the recipient that is not related to the properties like media richness. For example, using written communication may signify higher formality and higher commitment to the message contents. Face-to-face is often regarded as showing concerns and caring. Telephone may imply urgency and instantaneous connection. Trevino et al. (1990) suggested five types of symbolic meanings including legitimacy, teamwork, formality-informality, urgency and caring.

These symbolic meanings are often shaped over time within an organization and the authors suggested that mangers should be well aware of these media cues in order to communicate efficiently.

Social Influence Theory and Channel Expansion Theory. Some researchers cannot replicate the media choice pattern consistent with the media richness theory (e.g. Markus, 1994). These cases usually concerned with a new communication technology being introduced in an organization. Fulk, Schmitz and Steinfield (1990) proposed a social influence model of media choice based on the concepts from Social Information Processing Theory (Salancik & Pfeffer, 1978) and Social Learning Theory (Bandura, 1986). They argued that richness of a medium is not objectively defined and may vary across individuals. Furthermore, media choice is a learned and socially influenced process. Fulk et al. (1990) described the process as subjectively rational. An employee may use a new medium for communication because most of his/her colleagues are using it or they tell the person that they are satisfied with it and recommend the use of it.

Researchers favoring this theory prefer to include qualitative method to test the validity of the model. Interview answers like "[Electronic] Mail is my lifeblood. I use it for everything. My people [subordinates and indirect reports] all use it. Everything I do is through the Mail system." (Markus, 1994, p. 520) from a corporation director can strongly illustrate the effects of social influence.

In additional to the social influence theory, Carlson and Zmud (1999) further elaborated the idea of the formation of the richness perceptions of electronic media using their channel expansion theory. It posits that individual perceptions of media richness towards an electronic medium are developed from different experiences which build up individual knowledge base about that medium. These include experience with the communication channel, communication partners,

communication topic and the organizational context. Though the theory is not formulated to explain media choice, it is useful to understand people's perceptions to newer media that media richness theory sometimes fails to predict.

While social influence and channel expansion theories are frequently used as counterarguments to challenge the media richness theory, Webster and Trevino (1995) suggested both media richness theory and social influence theory should be treated as complimentary rather than competing theories in explaining media choice. Using a policy capturing design, they found that both theories are useful in explaining media choices in different situations. Media richness theory is more powerful in predicting the choice of traditional media like face-to-face, and social influence theory is better in explaining the choice of new media like electronic mail.

In addition to the two major theories, researchers are continuously searching for determinants from various aspects to explain media choice. Contextual determinant is one of them. It refers to the physical condition at the moment of communication or the requirement for successful delivery of the message. Trevino et al. (1990) classified it as one of the three categories of factors influencing media choice. These include the physical distance between the communicator and the recipient and time pressure for the communication. Long physical distance favors electronic mail and high time pressure favors the use of telephone. In addition, whether a medium reaches a critical mass of users (Markus, 1987) can influence users to choose that medium. Recipient availability at the moment of intended communication (Straub & Karahanna, 1998) can also affect media choice based on the notion of task closure. Task closure refers to the situation that in order to finish the communication as soon as possible, communicators prefer synchronous media like face-to-face and telephone when the recipient is available but asynchronous media like electronic mail when the recipients are temporarily out of the office. Number of recipients has also

been demonstrated in determining media choice. Media that allows sending messages to multiple recipients like electronic mail and voice mail are preferred when the communicator has to send the message to many people at the same time.

In another aspect, power relations between the communicators and recipients has been suggested to shape media choice (Kayany, 1996). Relational control and content control such as who gets hold of the target information has been proved to be factors influencing media choice in information seeking communication.

Yet there are few studies exploring media choice focusing on various dimensions of the message contents. Media richness theory has become a prescriptive theory that most of the researchers treat message equivocality as the key factor in the message content. It is argued that message equivocality may not be able to cover all the aspects carried in the message content. In addition, intentions of the communicators are also not explored from previous findings. People are assumed to be rational and choose media to maximize the communication efficiency. In the present study, new factors pinpointing message content and communication intentions are proposed. The context of interests here is performance feedback in which the message content always concerns the recipient personally.

Performance Feedback and Media Choice

Among various kinds of organizational communication, performance feedback is important in a sense that recipients can get correct information to maintain or improve their behaviors accordingly. Past studies show that proper performance feedback is significant to organizational outcomes (Larson, 1984) and ignorance of it may cause substantial corporate loss (Florin-Thuma & Boudreau, 1987). And one of the factors affecting the quality of the feedback is on the choice of communication channels (Hawkins, Burgio, Langford & Engel, 1992). Nevertheless, media choice process for performance feedback is seldom investigated.

In addition, performance feedback can be regarded as asymmetric communication (Sussman & Sproull, 1999). The communicators possess important information about the recipients and only the formers are aware of the need of communication at the moment. As a result, communicators are in a more active role in the whole process including media choice. The situation allows a higher degree of freedom for the communicators to decide how the message should be transmitted. Media choice can be treated as a decision based on the communicators' considerations. Message polarity and communication orientations are proposed in the following as new factors in influencing media feedback in the situation of performance feedback.

Message Polarity. It refers to whether the message is positive or negative to the recipient. It is well established that people communicate positive messages and negative messages differently, in which they are unwilling to deliver negative messages. This reluctance is termed as the mum effect (Tesser, Rosen & Batchelor, 1972). Nevertheless there are situations where people have to deliver negative news. In these cases, different strategies may be adopted. People may withhold the message and delay the delivery (Bond & Anderson, 1987). They may use politeness strategies (Brown & Levinson, 1987) which are supposed to cushion the message. A positive politeness strategy is to actively acknowledge the recipient's needs, while a negative one is to positively distort the message which makes it sound less negative to the recipient. Both strategies had been supported empirically (e.g. Fisher, 1979; Lee, 1993).

Adopting an experimental design, Sussman and Sproull (1999) studied the communication difference among participants when delivering either a positive or negative message to a confederate using different media. The message included some feedbacks on the confederate's job resume that actually was an instrument developed

by the experimenter to manipulate either a positive/negative message. Participants were assigned to groups to deliver the message either by face-to-face, telephone or computer-mediated communication. They found positive distortion of negative messages when the delivery was by face-to-face interaction but not on computer-mediated communication.

It is inferred that participants avoid direct criticisms and confrontation when sending a negative message. They try to alleviate the adverse effects by shaping the negative things in a more pleasant way and lead to a positive distortion of the message (negative politeness strategy) which can be termed as sugar coating (Sussman & Sproull, 1999). The findings reflect the difficulties of talking bad things about the person when meeting face-to-face.

This study is of significant implications to organizations. Sussman and Sproull (1999) suggested that positive distortion of criticisms will lead to information loss. The recipient cannot get the correct knowledge about his/her performance. Immediate improvement is not possible and organizational effectiveness is affected.

It is of interests to look at the process in the reverse way, studying how people select media to deliver positive and negative messages in performance feedback. From the above findings, it can be observed that people would generally employ politeness strategies when delivering negative messages. In order to do this, people would choose a channel which is able to establish closer interactions for better acknowledging the recipient's needs and/or allows more elaborate use of language for better distorting the message in a nicer way. It is hypothesized that face-to-face communication, which allows a full bandwidth of interactions and a high flexibility in language use according to personal needs, would be regarded as an appropriate channel to deliver negative messages.

For the case of delivering positive messages, adopting politeness strategies

should not be the concern for the communicators as the message is supposed to be well received by the recipient. Straight talk is welcome. The criterion of selecting appropriate medium may be shifted. It is suggested that communication effectiveness may be treated as a more important factor. Communicators would tend to deliver the message using the shortest time as possible. Taking this into account, telephone, electronic mail and written communication are considered as suitable media to use. The former allows setting up instantaneous conversation without investing energy in order to meet the recipient. The latter two are asynchronous media through which communication can be achieved from the effort of the communicators alone. It is more flexible and controllable from the view of the communicators. The hypotheses for the factor message polarity were thus formulated as follows.

Hypothesis 1a. People are more likely to choose face-to-face when the message is negative than it is positive to the recipient.

Hypothesis 1b. People are more likely to choose telephone when the message is positive than it is negative to the recipient.

Hypothesis 1c. People are more likely to choose electronic mail when the message is positive than it is negative to the recipient.

Hypothesis 1d. People are more likely to choose written communication when the message is positive than it is negative to the recipient.

Communication Orientation. It refers to the intentions or internal motives beheld by the communicators. According to the media symbolism (Trevino et al., 1990) mentioned above, media choice based on symbolic cues of a medium can be viewed as the motive or the intention of the communication. Past findings suggested that this motive is also influenced by other organizational factors. Kanungo (1998) studied the effect of organizational culture on computer-mediated communication. He found that in organizations with a task-oriented culture, people's communication

satisfaction was positively related to the computer-mediated communication usage. The opposite pattern was found for people-oriented culture organizations. Employees in a task-oriented culture focus less on interpersonal interactions and will rely on lean media for communication. People-oriented organizations treat face-to-face interaction as the key process to maintain relationships.

Different communication motives are also related to different communication styles. And this is of particular interests in the leadership style paradigm. The path-goal theory of leadership proposed by House (1996) emphasized the leader's role as clarifying the path in the work-goal attainment processes so the subordinates are more willing to work in order to achieve the rewards and satisfaction once the goal is attained. The communication style in this case can be interpreted as more task-oriented. While in the transformational leadership theory, Bass (1990) stressed the importance to stimulate and inspire the subordinates to develop to their full potentials. The communication style can be interpreted as more people-oriented, pinpointing the affective responses from the subordinates rather than task requirements.

It is possible to extend these findings to media choice when communicating messages with different motives. People may choose different types of media depending on the different intentions of the communication. In this study, people-oriented motives are narrowed down to showing concerns for the recipient's feelings and task-oriented motives are mainly referring to the accuracy of the communication. Face-to-face is thus more suitable for people-oriented motives. For telephone, due to its inability to transmit nonverbal cues like facial expression, it is not comparable to face-to-face for people-oriented motives. Its spontaneity favors it to deliver message quickly and accurately. For the leaner media like electronic mail and written, the "distance" between the communication parties make it more suitable

for task-oriented than people-oriented motives.

Hypothesis 2a. People are more likely to choose face-to-face when they concern the feelings of the recipients than they concern the accuracy of the communication.

Hypothesis 2b. People are more likely to choose telephone when they concern the accuracy of the communication than they concern the feelings of the recipients.

Hypothesis 2c. People are more likely to choose electronic mail when they concern the accuracy of the communication than they concern the feelings of the recipients.

Hypothesis 2d. People are more likely to choose written communication when they concern the accuracy of the communication than they concern the feelings of the recipients.

Hierarchy. This factor has been investigated in the literature but results are mixed. Thus it is also worthwhile to look at media choice in terms of status relationship between the communicator and recipient. D'Ambra et al. (1998) proposed that media choice is closely related to hierarchy within an organization. They concluded from factor analysis that message equivocality could be divided into subsets named as vertical and horizontal. The former refers to communication tasks that need crossing the boundary in an organization while the latter mainly includes intraboundary communication. The authors also observed a bias to face-to-face communication from higher status staff. It is suggested that media choice is closely related to hierarchy. Barry and Bateman (1992) used dyadic influence as theoretical basis to investigate the role of hierarchy on media choice including downward, horizontal and upward communications. They argued that upward and horizontal communication bears higher uncertainty in the message than downward communication which is mainly for securing compliance. Thus rich media is favored in upward and horizontal and lean media for downward communication.

Nevertheless the results did not fully support their hypotheses.

Based on the above findings, hypotheses for the hierarchy factor were formulated in the context of performance feedback. Only the cases of horizontal and downward communication were considered in the present study as there is seldom a performance feedback from subordinates to supervisors. So there is no hypothesis in the direction of upward communication in this study. For downward communication, instant face-to-face conversation (e.g. interrupting a subordinate at work) can be a very efficient way of getting information and exercising control over the subordinate. In addition, superiors are also eager to display formality through the use of formal documents in order to show authority.

Hypothesis 3a. People are more likely to choose face-to-face for downward communication than horizontal communication.

Hypothesis 3d. People are more likely to choose written communication for downward communication than horizontal communication.

On the other hand, horizontal communication involving peer colleagues often favor efficiency to formality. Convenience is suggested to be the norm of media choice.

Hypothesis 3b. People are more likely to choose telephone for horizontal communication than downward communication.

Hypothesis 3c. People are more likely to choose electronic mail for horizontal communication than downward communication.

Message Equivocality And Social Influence. As discussed above, message equivocality and social influence are the two main schools of media choice theories. In this study, they are treated as the control variables. For message equivocality, hypotheses are formulated based on Trevino et al. (1990) notion concerning a match between equivocality and media richness. For the factor social influence, as the

theory mainly concerns the effect of new media like electronic mail, and also based on the rationale from Webster and Trevino (1995), it is only hypothesized only for electronic mail.

Hypothesis 4a. People are more likely to choose face-to-face when the message is of high equivocality than low equivocality.

Hypothesis 4b. People are more likely to choose telephone when the message is of high equivocality than low equivocality.

Hypothesis 4c. People are more likely to choose electronic mail when the message is of low equivocality than high equivocality.

Hypothesis 4d. People are more likely to choose written communication when the message is of low equivocality than high equivocality.

Hypothesis 5. People are more likely to choose electronic mail for communication when the social influence for using electronic mail is high than low.

Research Approach

A common method of testing the media richness theory is to ask respondents to fill the desired medium to scenarios describing the communication task. Webster and Trevino (1995) adopted the policy capturing approach which is common in behavioral research to investigate media choice using different scenarios or vignettes. In each scenario, a number of variables were manipulated. As a result, participants' decision making mechanisms could be revealed.

This study follows the footsteps of Webster and Trevino (1995), using the policy capturing or factorial survey approach (Rossi & Nock, 1982) as the research design studying media choice. Policy capturing is basically employing scenarios and all possible combinations from the independent variables are included in the survey. This method is common in attitude or behavior capturing studies while it is not possible or convenient to manipulate the variables in experimental settings such as

reporting of child abuse (O'Toole, Webster, O'Toole & Lucal, 1999) and ways of resolving physical assaults (Bell & Forge, 1999). Wiederman (1999) suggested it as a convenient method in sexuality research such as condom usage in different sexual encounters.

In the scenarios of a policy capturing study, respondents are asked to evaluate the importance of each factor in each scenario and rate the tendency in choosing a particular medium for communication. The strength of the method is that studying participants' responses from hypothesized situations should have a strong indication of how they will choose media from different environment in reality. In addition, different media can have comparable statuses when referring back to the respondents' work settings rather than placing the respondents into experimental conditions using particular media with strangers. Researchers (e.g. Walther and Anderson, 1994; Walther, 1995, 1997) cast doubts on the differences found between computer mediated and face-to-face groups in experimental studies. They asserted that such difference were actually due to immature development of the computer-mediated communication groups. Adopting scenarios can neglect such adaptation processes to different media.

In addition to the scenarios, survey items were used to measure constructs that are not hypothesized in the study and but were found from past studies to be significant factors influencing media choice. These include perceived medium usefulness (Schmitz & Fulk, 1991), perceived medium richness (Trevino, Webster & Stein, 2000; Webster & Trevino, 1995) and experience in using electronic mail (Trevino et al., 2000). There are also other variables proposed and were controlled in the study. They relate to organizational factors and individual differences. These include business sector of the respondent's employed company, oral/written ability and typing speed. As all of the survey variables were treated as control variables in

the study, no specific hypothesis of their effects was made.

Method

Participants

Participants were recruited from three major sources. These included two large local organizations that are listed in the Hong Kong Stock Exchange. Both are the constituents of the Hang Seng Index. One is in the public utility and the other is in the communication and information technology business sector. Human resources officials from the two organizations were contacted in advance to gain approval for distributing the surveys in the company. The third source included a cluster of organizations with various sizes and business sectors. They were located by contacting friends of the authors who were employees of these companies. This source could be treated as a convenient sampling. The requirement for participation was that participants had to be Chinese to control for the language issues which may affect media choice. They also had to possess an individual electronic mail account and telephone extension number within their organization.

The participants were told from the survey that the purpose was to study employees' communication styles in using different communication channels. They would receive a fast food coupon as compliment when they completed and returned the survey.

There were 186 participants who returned the survey, representing a response rate of 31%. The response rate was comparable to surveys using similar design (e.g. Dulebohn & Martocchio, 1998).

Among these respondents, 29.8% was from the public utility company, 44.9% was from the communication and information technology company and 25.3% was from the convenient sampling companies. The distribution of the respondents by the sources is not even, χ^2 (2, $\underline{N}$ = 186) = 11.34, $\underline{p} < .05$. It was found that the responsible

officer of the communication company actively reminded the respondents to return the surveys while there was no such arrangement for the other two sources. Eight participants misread the instructions or missed out crucial items that made the data analysis impossible. The final sample size was thus reduced to 178.

Average age of the participants was 35.2 years (SD = 7.9) and 53.9% were females. There was 45.5% of the participants who had received tertiary education or above and 47.1% of them had at least one subordinate. Participants had substantial experiences in using electronic mail with an average of 5.05 years (SD = 2.35) and were proficient enough to type English with an average of 37.8 words per minute (SD = 17.5). However, 52.2% were not able to type Chinese. This variable was thus dropped in the subsequent analysis.

Design

The study used policy capturing to investigate the determinants of individuals' media choice process. Five independent variables including message polarity, communication orientation, hierarchy, message equivocality and social influence were manipulated in each scenario. Each variable consisted of two levels. Thus altogether there were thirty-two possible combinations (2 X 2 X 2 X 2 X 2) of the scenarios. Participants had to respond to all the thirty-two scenarios and reported their choice of communication media in various situations. The design was a within-subject design. There were also attitudinal and demographical items in the survey. The survey was constructed in Chinese.

To avoid possible ordering effect from a specific sequence of the scenarios, four versions of the survey were produced by varying the sentence sequences within a scenario (two sentence structure sequences) and the presentation sequences of the scenarios overall (two random scenario sequences).

Manipulations

The scenario described a situation that you had to deliver a message to the recipient concerning his/her performance in a latest project. The details of the five variables manipulated were listed as follows. All were dummy coded in the analysis.

Message Polarity. It referred to the nature of the message that the recipient would interpret it as either good news or bad news to the recipient. It was coded as 0 = negative messages and 1 = positive messages. The wordings were "He/She has done a good job and should be encouraged." for the positive message and "He/She has done a poor job and should improve timely." for the negative case.

Communication Orientation. It referred to the motive of the communication beheld by the communicator internally. It was coded as 0 = task-oriented and 1 = people-oriented motives. The wordings were "You intend to deliver the message accurately." for the task-oriented motives and "You intend to deliver the message showing concerns for the recipient's feelings." for the people-oriented motives.

Hierarchy. It referred to the relationship between the communicator and the recipient. There were two situations. Downward communication meant delivering a message to a subordinate while horizontal communication meant delivering a message to a peer colleague. The variable was coded as 0 = downward communication and 1 = horizontal communication. The wordings were "The recipient is a subordinate..." for downward communication and "The recipient is a peer colleague..." for horizontal communication.

Message Equivocality. It referred to the ambiguity of the message content which was proposed by Daft and Lengel (1984). The manipulation here adapted Webster and Trevino's (1995) manipulations in their policy capturing study. It was coded as 0 = low equivocality and 1 = high equivocality. The wordings were "The message mainly includes numerical figures" for low equivocality and "Part of the message

may require elaborations." for high equivocality.

Social Influence. Fulk et al. (1990) and Fulk (1993) posited that social influence should be more pronounced for new and high technology media like electronic mail than traditional media. Based on Webster and Trevino's (1995) approach, this variable was only manipulated for electronic mail. It was coded as 0 = low social influence and 1 = as high social influence. The wordings were "Some of your colleagues prefer to use electronic mail" for low social influence and "Most of your colleagues prefer to use electronic mail" for high social influence.

All the key wordings of the manipulation were printed in bold characters to reinforce the differences across the scenarios. Each manipulation sentence occupies a separate line. Below shows a typical example of scenario:

> Part of the message may require elaborations.
>
> Some of your colleagues prefer to use electronic mail.
>
> The recipient is a peer colleague and the message is related to a project that he/she is involved.
>
> He/She has done a poor job and should improve timely.
>
> You intend to deliver the message accurately.

A pilot study was carried out using 24 undergraduate students in a Hong Kong university to test the scenarios. They were interviewed afterwards about the wordings of the scenarios. The manipulations were proved to be successful and minor revisions of scenario wordings were made in the survey. Appendix A listed all the scenario sentences.

Manipulation Check. For the factor message polarity and communication orientations that were not based on any prior studies, manipulation check questions were asked after the respondents finished all the scenarios. For the factor message polarity, participants were asked two questions, "When the scenario contained the

sentence ("He/She has done a good job and should be encouraged." or "He/She has done a poor job and should improve timely."), how would you describe the feeling of the recipient?" Participants responded from 1 = extremely unhappy to 9 = extremely happy. For the factor communications orientation, two other questions were asked. They were "When the scenario contained ("You intend to deliver the message accurately." or "You intend to deliver the message showing concerns for the recipient's feelings."), how would you consider the following factors during the communication? (1) Accuracy of delivering the message (2) Feelings of the recipient. Participants responded from 1 = not consider at all to 9 = highly consider.

Powell and Mainiero (1999) noticed that fatigue of the participants caused by responding to large number of similar scenarios would be a hazard to the results. In order to reduce fatigue, the scenarios were separated into two parts. After filling the first part of the scenarios (sixteen in total), participants filled the first part of the survey items followed by the second part of the scenarios. Participants finished the rest of the survey items after finishing all the scenarios.

Dependent Measures

Participants were asked to rate the tendency to use a particular medium after each scenario on a seven-point Likert scale, 1 = Very unlikely to 7 = Very likely. The media included face-to-face, telephone, electronic mail and written communication. This selection was based on the fact that these are the most common communication channels within an organization and they cover a wide range of the media richness continuum (Trevino et al., 1990). In addition, these media have achieved a critical mass of users (Markus, 1987) thus having comparable statuses.

The term "written" was coupled with an illustration "e.g., memos or letters" in the survey. It deserved a note here. Yates and Orlikowski (1992) argued the difference in definitions between media and genres of communication. They posited

that memos and letters are genres of communication within the written medium. Electronic mail could be treated as a medium since the messages are transmitted electronically through the computer system or on the World Wide Web. Conceptually, it is more appropriate to use the term "written" rather than "memos or letter" to compare with the other media used. And the use of the illustration in the survey was for the sake of clarity to the participants.

Survey Measures

Demographics. Participants were asked to report gender, age, education level and number of subordinate as basic information. To control the effect of business sector of information technology (IT) on media choice, participants were classified into two groups, i.e., 0 = Non-IT-business and 1 = IT-business based on the business nature of their employed companies. For example, the public utility company in the sample was classified as non-IT-business while the communication company was classified as IT-business. It was hypothesized that for the IT-business companies, there might be a higher reliance on electronic mail in communication. Experience in years of using electronic mail was also asked. Trevino et al. (2000) found that usage of a new communication medium such as electronic mail was positively associated with the skill with that medium.

Communication Ability. It included Chinese and English typing speed (words per minute) estimated by the participants. Oral/Written ability was measured by two seven-point items asking the participants to compare their oral and written skills in English and Chinese. High scores indicated that participants thought their oral skill was better than written skill in that language. In a bilingual business society like Hong Kong, it is very common to communicate face-to-face in Cantonese but most of the paperwork including electronic mail are written in English. It is possible that proficiency in oral skills would make a person prefer face-to-face than written

medium in communication.

Communication Formality. It was measured by a three-item scale designed for this study (see Appendix B). It measured the participants' view on communicating in the paper medium in organizations. It would be logical to think of a person who thinks that putting things on paper is more persuasive and irreversible would prefer written communication to face-to-face or telephone. Reliability of the scale is just marginally acceptable (Cronbach's alpha = .53). It was kept in the analysis for exploratory purposes.

Perceived Medium Usefulness. Schmitz and Fulk (1991) included this measure in their social influence model of media choice. People would be more likely to adopt a medium when they think that it is useful. This scale comprised of three items selected and translated from Davis (1989) seven-item scale of perceived usefulness for information technology system. The items were selected in a way that could also be applied for media other than electronic mail. Participants thus were asked to evaluate the usefulness of the four media on a seven-point Likert scale from 1 = extremely unlikely to 7 = extremely likely (see Appendix B). The scale had a high internal consistency (Cronbach's alphas: face-to-face = .81; telephone = .84; electronic mail = .85; written = .89).

Perceived Medium Richness. Following the notion from the social influence theory that media richness is subjectively defined (Fulk, 1993), higher perceived medium richness would lead to a higher preference in using that medium. It was a four-item scale translated from Carlson and Zmud's (1999) adaptation of Daft and Lengel's (1984) definition of media richness (see Appendix B). Participants were asked to rate the ability of the four media to fulfill the four dimensions of media richness on a seven-point Likert scale ranging from 1 = not at all to 7 = very much (Cronbach's alphas: face-to-face = .81; telephone = .90; electronic mail = .78; written

= .82).

Procedure

Equal number of surveys was sent to the three participant sources. The responsible officials from the two main sources drew a random sample from their company and distributed the surveys through internal mailing. Each survey attached a cover letter stating explicitly the purpose of the study and mentioned that it had gained support from their company. Respondents sent the completed survey directly to the researcher using the attached postage paid envelope. For the convenient sampling source, the procedures were the same except for the cover letter wording that had not mentioned support from the participant's company.

Data Analysis

Within-Subject Analysis. This is common for policy capturing studies (e.g. Martocchio & Judge, 1994; Powell & Mainiero, 1999). An ordinary least square regression equation was fitted for each participant using the within-subject variables, i.e., the five variables in the scenarios. This allowed a preliminary examination of the explanatory power of these variables to each participant. Following the approach used by Webster and Trevino (1995), the pattern and distribution of regression coefficients were examined.

Overall Model. As mentioned, policy capturing is basically a within-subject design. The variables manipulated in the scenarios were treated as within-subject variables. The survey items which the participants filled were treated as between-subject variables. Thus the data set had a nested structure where within-subject variables were nested within the between-subject variables for each participant. However, many policy capturing studies on various areas such as justice (Dulebohn & Martocchio, 1998), child abuse (O'Toole, Webster, O'Toole & Lucal, 1999) and sexual behaviors (Finkelstein & Brannick, 1997) treated such kind of data

set as independent observations on the level of scenario responses. The sample size for analysis became the number of participants multiplied by the scenarios responded by each participant. And the values for the between subject variables were duplicated to fill up for all the scenario trials of each participants. And the common method for analysis was ordinary least square regression. Though there were researchers suggesting better methods of regression such as "smart ridge regression" (Holzworth, 1996) and generalized least squares regression (Judge & Bretz, 1992) to improve the statistical estimation, the problems concerning independent observations remained unresolved.

Bryk and Raudenbush (1992) mentioned that ignorance of the nested structure of the data set would hamper the estimation of the standard errors of the regression coefficients. In the case of ordinary least square regression approach where between subject data were duplicated for each repeated measures scenarios, the estimation of standard errors would become smaller and inflated Type I error in hypothesis testing.

To tackle this problem, Hierarchical Linear Modeling (HLM) was used in the present study (Bryk & Raudenbush, 1992). It could be treated as an approach in performing a multilevel regression. HLM were run with the repeated measures scenarios as the level-1 variables and the survey measures as the level-2 variables.

HLM is well suited to treat similar kinds of repeated measures design as a two-level data structure. For example, there are studies concerning dynamic performance of sewing machine operators over time (Deadrick, Bennett & Russell, 1997), creative performance of film directors (Zickar & Slaughter, 1999) in their career and children's development of phonological awareness (McBride-Chang, Wagner & Chang, 1997). Nevertheless, it is not popular to apply the same approach in the case of policy capturing.

In order to test the hypotheses properly, there is a sequence of model fitting to

investigate the unique contribution of the hypothesized variables. These models are termed as submodels in HLM (Bryk & Raudenbush, 1992). The steps included the null model in which no predictors were fitted into the equations. It was followed by the means-as-outcome model while level-2 variables were fitted into the level-2 equation. The final step was the slopes-and-intercepts-as-outcomes model in which the scenarios variables were fitted into the level-1 equations and cross-level interaction terms were fitted in the level-2 equations. The software HLM for Windows 5.02 was used for the analysis. The estimation method applied was full maximum likelihood. This estimation procedure allowed comparing the model fitness between nested models with the addition of fix effects using a likelihood ratio test (Raudenbush, Bryk & Congdon, 2000). Details of the respective models are described in Appendix C. Figure 1 also summarizes the HLM approach in dealing with the data structure of the study.

Results

Survey Version Effect. From the response rate among the four versions of the survey, there was no significant effect for favoring a particular version, χ^2 (3, $\underline{N}$ = 178) = 1.506, ns. Furthermore, the question of whether participants responded to four versions of the survey differently was investigated. Aggregated means for every participant on the four dependent measures were used and a 2 (sentence structure sequence within a scenario) X 2 (scenario sequence) factorial MANOVA was performed. As the number of observations was large, a stringent type I error value of .01 could be justified. Results showed that there was no significant version bias and ordering effect. All the participants thus were kept in the subsequent analysis.

Manipulation Check. For the factors message polarity and communication orientation, there were items testing whether the manipulations succeeded. Paired-sample t-tests were performed. For the factor message polarity, participants

rated the positive messages as having a significantly higher positive effect to the recipients than the negative messages, t (176) = 34.21, $p < .001$. For the factor communication orientation, participants considered the accuracy in delivering the message significantly higher than showing concerns to the recipient's feelings when the scenario requested them to focus on communication accuracy, t (173) = 10.95, $p < .001$. Participants considered the feelings of the recipients significantly higher than communication accuracy when the scenario requested them to show concerns to the recipient's feelings, t (171) = -3.08, $p < .01$. The above showed that the manipulations of the two variables were successful.

As shown in Table 1, participants in general showed different preferences to the four communication media. Results from the repeated measures MANOVA using aggregated media scores for each respondent showed that participants treated the four media significantly different, F (3, 175) = 119.1, $p < .001$. Face-to-face was rated highest, followed by electronic email, telephone and written medium. Treating all the 5696 observations (32 scenarios X 178), the number of times of each media being rated as the first choice (including tied first choice) was also counted. For face-to-face, the percentage that the participants rated it as the first choice was 67.1%, followed by 42.6% for electronic mail, 18.7% for the telephone and 15.0% for the written medium. This was identical with the order of the aggregated media scores.

For perceived medium usefulness, participants rated the four communication media significantly different, F (3,175) = 98.1, $p < .001$. Face-to-face was rated as most useful, followed by electronic mail, telephone and written. For perceived medium richness, participants also rated the four communication media significantly different, F (3,175) = 393.5, $p < .001$. Face-to-face was rated as the richest, followed by telephone, electronic mail and written. In terms of medium richness, electronic mail was ranked lower than telephone, an order not consistent with the general

preferences and the perceived medium usefulness.

Within-Subject Analysis. Regression equations were fitted for each participant using only the five scenarios variables as predictors. This analysis did not mean to test the hypothesis formally. Rather it showed a picture of the predictive power of the variables for each individual. The full set of regression equations is available from the author. The number of significant standardized regression coefficients ($p < .05$) and the respective directions of those coefficients are shown in Table 2.

For predicting the choice of face-to-face communication, only 161 out of 178 regression equations could be fitted due to the fact that there was no variation in the dependent measures in all the thirty-two scenarios for 17 participants. Among these 161 equations, R Square ranged from .02 to .97. For predicting the choice of telephone communication, only 170 regression equations were fitted for similar reasons and R Square ranged from .04 to .90. For predicting the choice of electronic mail communication, 173 regression equations were fitted and R square ranged from .06 to .97. Finally for predicting the choice of written communication, 153 regression equations were fitted and R Square ranged from 02 to.98. There were large variations in terms of explanatory power of the variables in the scenarios for the participants. In addition, there was an average 8% of the participants across the four media, though not very large, did not seem to be influenced by the scenarios and persisted their view on the usage on the communication media. This situation was the most severe for written communication, the medium lowest in the media richness continuum.

A more detailed picture could be revealed if the focus shifted to the directions (whether β was larger or smaller than zero) of the significant standardized regression coefficients ($p < .05$) of respective variables (see Table 2). For the factor message polarity, participants were more likely to choose electronic mail (0 negative

coefficients versus 59 positive coefficients out of overall 59 significant regression coefficients), telephone (5 versus 44 out of 49) and written (3 versus 25 out of 28) when the message is a positive one. For the factor communication orientation, electronic mail (25 versus 1 out of 26) and written medium (19 versus 4 out of 23) was rated higher when the respondents were asked to emphasize the accuracy of the message delivery. For the factor Hierarchy, face-to-face (52 versus 3 out of 55) and written medium (20 versus 5 out of 25) was rated higher in downward communication. Telephone was rated higher in upward communication (8 versus 36 out of 44). For the factor message equivocality, face-to-face (1 versus 30 out of 31) and telephone (2 versus 33 out of 35) were rated higher when the message was highly equivocal. Electronic mail (37 versus 1 out of 38) and written (21 versus 4 out of 25) was rated higher when the message was unequivocal. For the factor social influence, electronic mail (2 versus 41 out of 43) was rated higher when the social influence was high. The patterns of the coefficients the last two variables basically replicated the findings of Webster and Trevino (1995) using media richness theory and social influence theory as complimentary theories in explaining media choice.

Within-subject analysis revealed a number of observations from the data set. Huge individual differences existed in responding to the scenarios. In the most extreme cases, participants simply followed their own media preference in all the scenarios. This makes regression analysis impossible. Nevertheless, from the pattern of the directions of the regression coefficients, the influence from each of the variables could be revealed in a certain extent.

HLM Analysis[1]

HLM Analysis was reported here for each of the dependent variable respectively.

Face-to-Face. Table 3 summarizes the HLM analysis results step by step for the

dependent variable face-to-face. In the first step a model without putting any predictors in both level-1 and level-2 was fitted. The variance component of the error term u_{oj} (τ_{00}) of the second level equation indicated whether significant variation existed between individuals. Results showed that it was significant ($\tau_{00} = 0.84$, χ^2 (177) = 4833, $p < .001$). Bryk and Raudenbush (1992) proposed a way of calculating the proportion of level-2 variance in the model which was a simple ratio of variance component in level-2 to the model overall. It is called the intraclass correlation. In the present case, this ratio was 0.84/(0.84 + 1.02) = 0.451, showing that about 45.1% of variance lied between the individuals. This justified the need to treat the data set in a nested structure and to use HLM as the analytical tool.

In the means-as-outcomes model, a number of between-subject variables were fitted into the level-2 equation to predict the individual mean which was the intercept term of level-1. These variables included the perceived medium usefulness, perceived medium richness, business sector, communication formality and oral/written skills in English and Chinese. They were controlled in predicting face-to-face as the communication medium before the addition of the scenario variables. Only perceived medium usefulness ($\gamma_{01} = 0.27$, t (171) = 4.03, $p < .001$) and perceived medium richness ($\gamma_{02} = 0.36$, t (171) = 3.71, $p < .001$) were significant. Participants who perceived face-to-face as more useful or richer media were more likely to select it in communication. Differences in the deviance between two models served as a Chi-square test testing the superiority of the new model to the previous one. Results showed that fitting second level predictors improved the model fit than the null model ($\Delta D(6) = 49$, $p < .01$). Bryk and Raudenbush (1992) also suggested a method of calculating the proportion of variance explained by level-2 predictors. It was the comparison of the variance components between the two models in a ratio term which is (0.84-0.63)/0.84 = 0.25. This meant about 25% of between-subject

variance was explained by the addition of the level-2 predictors.

In the intercept-and-slope–as-outcomes model, the five scenario variables were added in the level-1 equation. Among them, three were significant. Participants were more likely to choose face-to-face when the recipient was a subordinate rather than a peer colleague, $\gamma_{30} = -0.42$, $t\ (177) = -7.40$, $p < .001$. Hypothesis 3a was supported. Participants were more likely to choose face-to-face when the message was highly equivocal, $\gamma_{40} = 0.23$, $t\ (177) = 6.71$, $p < .001$. Hypothesis 4a was supported. In addition, highly social influence of using electronic mail imposed a negative effect for participants to use face-to-face communication indicated by the negative sign of the coefficient, $\gamma_{50} = -0.01$, $t\ (177) = -3.65$, $p < .001$, though it was not hypothesized in the study. However, participants did not tend to choose face-to-face when the message was negative, $\gamma_{10} = 0.08$, $t\ (177) = -3.65$, ns. Hypothesis 1a was not supported. Participants were not more likely to choose face-to-face when they were asked to be concerned with the recipient's feelings, $\gamma_{20} = -0.09$, $t\ (177) = -0.30$, ns. Hypothesis 2a was not supported. Accessing the model fitness, this model had improved significantly showing a large decrease in deviance from the previous model with the second-level predictors only ($\Delta D(25) = 1401$, $p < .001$). Bryk and Raudenbush (1992) also suggested a method calculating the reduction of variance in level-1 after adding these variables from the variance components in the HLM outputs. It was (1.02-0.67)/1.02 = 0.343, showing that about 34.3% of within-subject variance was accounted by the scenario variables. All the variance components (τ_{11}, τ_{22}, τ_{33}, τ_{44}) of the random effect in the level-2 equations except for social influence (τ_{55}) were significant, showing that systematic variations across individuals existed for the effects of these level-1 variables.

Telephone. Table 4 summarizes the HLM results using telephone as the dependent variable. For the null model, the variance component of the level-2

random effect (τ_{00}) was significant ($\tau_{00} = 1.26$, χ^2 (177) = 6029, $p < .001$). The intraclass correlation was equal to 1.26/(1.26 + 1.23) = 0.506, showing that about 50.6% of variance of choosing telephone for communication lied in the between-subject level.

In the means-as-outcome-model, the same level-2 predictors as in the face-to-face analysis were added in the level-2 equation in predicting the intercept term β_0. Similar to the results in the face-to-face analysis, only perceived medium usefulness ($\gamma_{01} = 0.31$, t (171) = 3.42, $p < .01$) and perceived medium richness ($\gamma_{02} = 0.26$, t (171) = 3.01, $p < .01$) were significant. Business sector, communication formality, oral/written abilities in English and Chinese had no effect in predicting the scores of choosing telephone. This model improved significantly from the null model ($\Delta D(6) = 39$, $p < .001$). The ratio of reduction in variance was equal to (1.26-1.01)/1.26 = 0.198, showing 19.8% of level-2 variance was accounted by these predictors.

When the five scenario variables were added in the intercept-and-slope-as-outcomes model, four of them were significant. Participants tended to rate telephone higher when the message was positive, $\gamma_{10} = 0.31$, t (177) = 6.073, $p < .001$. Hypothesis 1b was supported. They tended to rate telephone higher when the recipient was a peer colleague, $\gamma_{30} = 0.30$, t (177) = 5.87, $p < .001$. Hypothesis 3b was supported. For the factor message equivocality, participants tended to rate telephone higher when the message was highly equivocal, $\gamma_{40} = 0.27$, t (177) = 5.70, $p < .001$. Hypothesis 4b was supported. Though the factor social influence was not hypothesized for telephone communication, when the social influence favoring the use of electronic mail was high, there was a negative effect for participants in choosing telephone indicated by the negative sign of the coefficient, $\gamma_{50} = -0.10$, t (177) = -4.01, $p < .001$. Participants did not rate telephone higher when

they were asked to deliver the message accurately. Hypothesis 2b was not supported. For the variance components of the error terms in the four significant level-1 coefficients ($\tau_{11}, \tau_{33}, \tau_{44}, \tau_{55}$), only social influence was not significant, $\tau_{55} = 0.01$, χ^2 (177) = 170.0, ns. That meant there was no more variation of the effect of social influence existed across individuals. Reduction of within-subject variance could be expressed by the ratio of level-1 variance components between the present and previous model (1.23-0.89)/1.23 = 0.276. That was, about 27.6% of the within-subject variance was explained by the scenario variables. The improvement of the model fitness of the present model was also significant, $\Delta D(25) = 988$, $p < .001$.

Electronic Mail. Table 5 summarizes the results of the HLM analysis using electronic mail as the dependent variables. In the null model, the variance component of the level-2 random effect was significant ($\tau_{00} = 1.01$, χ^2 (177) = 4807, $p < .001$). The intraclass correlation was 1.01/(1.01 + 1.23) = 0.451. Thus about 45.1% of the total variance for the dependent variable lied in the level-2.

In the means-as-outcomes model, two additional variables were added into the equations at level-2 in addition to the six variables used in the analysis for face-to-face and telephone. These included email experience and English typing speed. Both were additional control variables in predicting the electronic mail as the communication medium. Perceived usefulness of the medium ($\gamma_{01} = 0.35$, t (169) = 4.42, $p < .001$), business sector ($\gamma_{03} = 0.32$, t (169) = 2.50, $p < .05$), communication formality ($\gamma_{04} = 0.20$, t (169) = 2.40, $p < .05$) and English typing speed ($\gamma_{07} = 0.01$, t (169) = 2.22, $p < .05$) were significant. Different from the previous analysis, perceived medium richness for electronic mail was just marginally significant ($\gamma_{02} = 0.13$, t (169) = 1.93, $p < .06$). Also, the present analysis suggested that email experience was not related to a higher tendency to choose electronic mail for communication ($\gamma_{08} = 0.007$, t (169) = 0.252, ns). Oral/Written skills of both English

and Chinese were also not significant (γ_{05} = 0.007, t (169) = 0.157, ns; γ_{06} = -0.009, t (169) = -0.167, ns). For the deviance test, the improvement in fitness from the previous model was significant, $\Delta D(8) = 68$, $p < .001$. The ratio of the decrease of level-2 variance could be expressed by (1.01-0.68)/ 1.01 = 0.326. About 32.6% of the between-subject variance was accounted by these eight level-2 variables.

In the intercept-and-slope-as-outcomes model, results showed that four out of the five scenario variables were significant. Participants tended to choose electronic mail when the message was positive, γ_{10} = 0.54, t (177) = 8.294, $p < .001$. Hypothesis 1c was supported. They also preferred to use electronic mail when they would like to communicate the message accurately, γ_{20} = -0.17, t (177) = -5.314, $p < .001$. Hypothesis 2c was supported. They tended to choose electronic mail when the message was unequivocal, γ_{40} = -0.31, t (177) = -8.276, $p < .001$. Hypothesis 4c was supported. In addition, high social influence induced higher tendency in using electronic mail for communication γ_{50} = 0.28, t (177) = 8.62, $p < .001$. Hypothesis 5 was supported. However, hierarchy was shown to have no effect, γ_{30} = 0.017, t (177) = 0.348, ns. Hypothesis 3c was not supported. For the variance components of the significant level-1 variables, all four (τ_{11}, τ_{22}, τ_{44}, τ_{55}) were significant. This model had a better model fitness than the previous model, $\Delta D(25) = 1600$, $p < .001$. From the ratio stating the decrease in level-1 variance which was (1.23-0.76)/ 1.23 = 0.382, approximate 38.2% of within-subject variance were accounted by the scenario variables.

Written. Table 6 summarizes the HLM results using written as the dependent variable. In the null model, significant variation was found at the between-subject level, τ_{00} = 2.32, χ^2 (177) = 12847, $p < .001$. The intraclass correlation was 2.32/ (2.32 + 1.03) = 0.693. About 69.3% of total variance lied across the individuals. It was the highest ratio among the four dependent variables.

For level-2 predictors, seven were used excluding electronic mail experience which was not hypothesized treated as a control variable here. Only perceived medium usefulness ($\gamma_{01} = 0.64$, t (170) = 7.615, $p < .001$) and communication formality ($\gamma_{04} = 0.33$, t (170) = 2.527, $p < .05$) were significant. Perceived medium richness, business sector, oral/written skills in English and Chinese and English typing speed were not significant. The reduction of the between-level variance could be expressed by the ratio (2.32-1.60) / 2.32 = 0.310. About 31% of between-subject variance was accounted by the level-2 variables. The improvement of model fitness was also significant, $\Delta D(7) = 64$, $p < .001$.

In the intercept-and-slope-as-outcomes model, four of the five scenario variables were significant. Participants tended to rate written communication higher when the message was positive, $\gamma_{10} = 0.23$, t (177) = 4.733, $p < .001$. Hypothesis 1d was supported. They would also rate written communication higher when they were told to deliver the message accurately, $\gamma_{20} = -0.12$, t (177) = -3.754, $p < .001$. Hypothesis 2d was supported. Written communication was preferred when the recipient was a subordinate, $\gamma_{30} = -0.13$, t (177) = -2.534, $p < .05$. Hypothesis 3d was supported. They tended to choose the written medium when the message was unequivocal, $\gamma_{40} = -0.21$, t (177) = -4.988, $p < .001$. Hypothesis 4d was supported. Deviance test showed that this model had a significant improvement over the previous model, $\Delta D(25) = 949$, $p < .001$. The reduction of the level-1 variance could be expressed by the ratio (1.03-0.74)/1.03 = 0.282. Thus about 28.2% of within-subject variance could be accounted by the scenario variables.

Face-to-face Versus Electronic Mail. The above analysis aimed to test the hypotheses directly but it treated the four dependent variables separately. An additional analysis was carried out to see if the factors under studied had opposing effects for different media. Thus it could show whether each independent variable

favors the selection of a particular medium while inhibits the selection of other media. The preference between face-to-face and electronic was chosen as the target. Firstly, they occupy both ends on a media richness scale (Trevino et al., 1990). They can also be classified as verbal versus text-based media (D'Ambra et al., 1998). Finally, face-to-face is a traditional communication while electronic mail is a computer mediated media.

The same HLM analysis was performed using the face-to-face minus electronic mail scores as the new dependent variables. Table 7 summaries the results. As the findings of the null model and the means-as-outcomes model were the same as the models using individual medium as dependent variables, they are not reported here.

In the intercept-and-slope-as-outcomes model, the intercept term was positive, $\gamma_{00} = 1.12$, $t(167) = 6.94$, $p < .0001$. It showed that generally the participants had a higher preference to face-to-face over electronic mail (1.12 points higher). For the five scenario variables, all were significant. Looking at the factors message polarity, hierarchy and social influence, the coefficients were negative. It showed that when the message was positive, delivered horizontally or the social influence of using electronic mail was high, the difference between choosing face-to-face and electronic mail diminished. For the variables communication orientation and message equivocality, the coefficients were positive. It showed that when concerns for the recipient's feelings was emphasized and the message was highly equivocal, the difference between the two media increased, favoring face-to-face. It could be concluded that the scenario variables had different but not necessarily opposing effects on the two media. Providing the participants has a general preference to face-to-face over electronic mail, the operations of the scenarios might not be able to change the final media choice (counting the highest media preference scores).

Discussion

The factors under studied generally exerted their effects on selected media rather than on all four media. For message polarity, the effects were significant for the telephone, electronic mail and written communication but not face-to-face communication (Hypothesis 1b, 1c & 1d were supported; Hypothesis 1a was not supported). For communication orientation, the effects were significant for electronic mail and written communication but not for face-to-face communication and telephone (Hypothesis 2c & 2d were supported; Hypothesis 2a & 2b were not supported). For hierarchy, the effects were significant except for electronic mail (Hypothesis 3a, 3b & 3d were supported; Hypothesis 3c was not supported). The effects of message equivocality and social influence were significant for all media (Hypothesis 4a, 4b, 4c, 4d & 5 were supported). It can be seen that except message equivocality and social influence, the factors proposed in the study did not exert opposing effects on different media. When making media choices, participants tended to weight certain factors rather than all the factors in the scenarios.

Among the scenario variables, message polarity was found to be supporting hypotheses only in the positive message situations. When the message is positive to the recipient, people are more likely to choose telephone, electronic mail and written medium. No significant results were found for the negative message situations. This finding cannot be explained by the media richness theory as both rich and lean media are selected in the case of positive messages. As people can simply talk straight to the recipients in the positive message situations (Sussman and Sproull, 1999), it is suggested that for positive message situations, media preference reflects a consideration based on convenience and efficiency reasons. The uses of more convenient and efficient media thus prevail.

For negative message situations, the failure to obtain a significant result signified large individual differences exist. Participants significantly preferred

telephone, electronic mail and written for positive message but not preferring face-to-face in the case of delivering negative messages. This may imply the general difficulty and undesirability for people to communicate bad things (Tesser et al., 1972) which will possibly hurt the recipient. The "best" choice of media is not obvious. Some respondents may consider face-to-face as they can easily shape the message according to their need while other may view other media as more convenient and direct in sending the message. Future studies can focus on how people perceive the role as a communicator in delivering negative messages, what their concerns are and how these are affecting the choice of media subsequently.

For the independent variable communication orientation, when participants were asked to send the message accurately, they tended to choose lean media like electronic mail and written medium but not for telephone which was originally hypothesized. People generally may view electronic mail and written communication as stiff media not appropriate to communicate emotional contents. For telephone, it is suitable for fast and accurate message delivery. At the same time its ability for synchronous conversation can allow better emotional exchanges. Thus people may not view the medium telephone differently under task and people-oriented communication motives. Similar case happened for the medium face-to-face. There was no effect on favoring face-to-face when people would like to be concerned with the feelings of the recipient. It is suggested that people view face-to-face and telephone as capable for both task-oriented and people-oriented intentions. For face-to-face, its superiority to concern the recipient's feelings does not hinder its ability in delivering messages accurately. Future studies may identify workers with tasked-oriented and people-orientated communication styles and look at their media choice patterns respectively.

Results of the factor hierarchy supported the hypotheses except for the case of

electronic mail. The major implication here is that the effect of hierarchy should not be related to media richness considerations suggested by Bruce and Bateman (1992). People's preferences for face-to-face and written in downward communications may reflect their intentions to exert control and also guarantee immediate exchanges. While for horizontal communications, people preferring telephone may imply the need for convenience, efficiency and casual communication. D'Ambra et al. (1998) found that media choice was clearly status related. Further work should include this factor as a major determinant in media choice. For electronic mail, the absence of a hierarchy effect may be related to the uniqueness of the medium for communication across the hierarchies. Future studies should investigate the relationship between hierarchy and the perceptions on electronic mail as the introduction and promotion of use of new communication media is always initiated by the top management (Markus, 1994). Furthermore, future studies may encompass the hierarchy in a more complete sense as the study did not include the situation of upward communication.

Results from the variables message equivocality and social influence replicated past findings. For message equivocality, the notion of match suggested by Daft et al. (1984) was further supported. Participants tended to use rich media for equivocal messages and lean media for unequivocal messages. For social influence, a strong social influence for electronic mail use would favor choosing the medium. And it was found that such a high social influence would have a negative effect in choosing rich media. This clearly demonstrated how social influence makes people use electronic mail for all sorts of tasks regardless of equivocality (Markus, 1994).

Interactions among factors in the scenarios had not been investigated in the study. The main reason for this is that there is no strong theoretical basis in testing particular interactions among the scenarios factors. Thus there is no hypothesis testing interactions. Another reason of not testing interactions is the complexity

imposed on the analysis procedures. Though it is common to test full factorial interactions for exploratory purposes, imposing such a large number of interaction terms will make the estimations in HLM analysis unnecessarily unstable. In addition, past studies in media choice seldom investigate interactions but focus on main effects (e.g. Webster & Trevino, 1995; Webster et al., 2000).

Future studies may look at the relationship among the media choice variables and hypothesized targeted interactions for testing. It is suggested here that hierarchy may interact with message polarity in choosing the medium face-to-face. Though a significant main effect of message polarity is not found in the study, it is suggested that people may have a higher tendency to choose face-to-face for negative messages in downward communication compared to horizontal communication. As a supervisor, clear and detailed feedback and motivation for the subordinates to improve is important in good management of the staff. Face-to-face conversations can accomplish these goals more effectively.

Media Preference And Bias

The media preference pattern revealed in this study is obvious. Participants favor face-to-face, followed by electronic mail, telephone and written media. This pattern does not replicate the order in the media richness continuum suggested by Trevino et al. (1990). Though message equivocality is balanced in every set of scenarios, the differential preference of media is still observed, showing participants' higher preference to face-to-face and electronic mail. D'Ambra et al. (1998) used managers as participants to response a set of scenarios that were tailor made to the sampled organization to ensure ecological validity. They concluded a bias towards face-to-face communication from the managers as the choice of using face-to-face communication could not be accounted for by richness of that medium.

In the present study, the sample consisted of a mixture of workers from different

strata in the organizations (47.1% of the respondents did not have a subordinate). Bias to face-to-face is still observed. This bias may be general for all levels of employees. For electronic mail, a similar bias was observed with its average ratings significantly outweigh a richer medium telephone. This bias is clearer when we look at the perceived richness ratings of the four media. The ranking resembles the media richness continuum with face-to-face communication as the richest, followed by telephone, electronic mail and written messages. Nevertheless, perceived medium richness of electronic mail cannot predict the choice of that medium in the scenarios. Similar situation also appears for the written medium. The inability of perceived medium richness to explain media choice in written messages implied a negative bias to the written medium.

The above observation bears some implications for future studies. There seems to be a whole lot of dimensions and users' subjective perceptions across communication channels that are not captured by the concept media richness. Also, it confirms the notion (Trevino et al., 2000) that the existing media richness rankings of common communication media need to be reassessed. The emphasis should be placed on electronic mail, while its effects as a new technology may change over time. Furthermore, it is suggested here that the changing perceptions on electronic mail may have effects on the perceptions on the written medium as they belong to channels under the text-based classification (D'Ambra et al., 1998). The observed positive bias to electronic mail and negative bias to written may be coupled together as there is always a proposition that the Internet including electronic mail would change the working place into paperless one.

It is noted that the bias mentioned above may relate to the concept of media insensitivity. Referring to the within-subject analysis, there were approximately 8% of respondents whose ratings did not show any variation across the scenarios on the

four dependent variables. Thus within-subject regression equations could not be computed. There may be some reasons for this insensitivity. Respondents might see themselves invariant in the context of performance feedback in terms of media choice. They might have persistent view on a certain medium regardless of communication situations. This may also explain the low explanatory power of variables such as media richness in media choice. D'Ambra et al. (1998) used media richness and related variables such as location between communicators and recipients as predictors in explaining media choice. Adjusted R Square ranged from .08 to .24. Daft and Lengel (1987) linked media insensitivity to managers' inferior performance. This is one of the few study investigating this concept in the literature. Further studies should address the issue about how media insensitivity affect the findings to media choice studies and explore the antecedents and consequences of media insensitivity.

The medium face-to-face is further discussed here. People tend to have a bias to face-to-face in almost any situations. Face-to-face communication allows a full bandwidth interaction between the communicator and the recipient. Exchanges take place in every second and in every modality. Not mentioning about non-verbal cues and tones of speech, many affective reactions such as trust (Sarbaugh-Thompson & Feldman, 1998), perception of abilities (e.g. in job interviews) and empathy can be more effectively built up in face-to-face communication. Such uniqueness of face-to-face communication makes it a more interesting medium in media choice. Preferring face-to-face may mean more than a "choice" explained simply by rational reasons. Researchers may put their effort in exploring more underlying meanings of choosing face-to-face besides rational and contextual reasons in the organizational context.

Using HLM in Survey Yielding Two-Level Data Set

This study adopted HLM as the analytical tool. The decision was based on the fact that data were gathered from a survey which consisted of a series of policy capturing scenarios and attitudinal items. The former yielded within-subject repeated measures data while the latter yielded between-subject data. Thus the data provided by the respondents were in a two-level structure. HLM takes into account of this data structure. This method of analysis is more appropriate than other techniques which involve aggregation and disaggregation of data. One usual analytical method in policy capturing designs in using ordinary least square regression with the number of scenarios multiplied by the number of respondents as the sample size (e.g. Martocchio & Judge, 1994; Rossi, & Anderson, 1982). The assumption of independent of observations in the magnified sample size is questioned.

Another strength of HLM in dealing with the present dataset is its ability in investigating cross-level interaction. From the within-subject regression analysis, it can be seen that there exists large individual differences for the predictive power of the scenario factors. By fitting level-2 variables into the equations to predict the coefficients of the level-1 variables, potential moderating effect of the scenario variables can be investigated.

Up to the author's knowledge, there is currently no published article of policy capturing study using HLM as the data analysis technique. Further studies combining repeated-measured scenarios ratings with attitudinal and demographical data should not neglect the two-level structure when combining these data in a model for analysis. And HLM is suggested here as a statistically speaking more appropriate tool in treating such kinds of data.

Limitations and Future Directions

Though the strength of policy capturing is the ability to understand individual's decision criteria under hypothetical situations, its weakness is on its low ecological

validity. The scenarios used in the study suggest a general performance feedback situation which may not be applied in the actual work setting of the respondents. They may not face similar situations in their work and the targeted variables may be manifested in other ways in real settings. This limits the generalization of the findings.

Another limitation is the inability to perform cross-sectional comparisons. Though the present sample is large enough to draw statistically powerful results, it is not enough for sub-group analysis. Hinds and Kiesler (1995) found different media usage patterns between technical and administrative workers. It would be interesting to see if the difference persists in media choice on hypothetical scenarios.

This study recruited only employees in Hong Kong as the sample. The picture may be more complete if we investigate cultural differences as it may play a part in organizational media choice. Hofstede's classic study (1980) proposed four cultural variables including power distance, uncertainty avoidance, individual-collectivism and masculinity-femininity that are universal. Offermann and Hellmann (1997) used midlevel managers as the sample and found that managers high in power distance are evaluated poorer on communication behaviors. The dimensions of the communication measured included clarifying goals and objects, feedback and recognition for good performance as well as others. It is suggested that the cultural variable power distance may influence the patterns of the factors in this study on media choice. And this would interact with the variables under studied affecting media choice. Future studies may expand the scope of investigation to include participants from countries varying in power distance.

Conclusion

This study demonstrates that prevalent media choice theories only deal with certain aspects of a possibly complicated decision process of choosing the suitable

medium to communicate. Focusing on the area of message content for the communication, equivocality is not sufficiently accounting various communication situations in an organization. In this study, message polarity and communication orientation are proposed as factors affecting media choice in the context of performance feedback. Some of the hypotheses are supported in a certain extent while further studies should continue exploring the subtlety during the media choice process and the uniqueness of face-to-face compared to other communication channels.

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Footnotes

[1]During the data analysis, a second stage was originally included when fitting the slopes-and-intercepts-models. The purpose was to test for potential cross-level interactions. It was done by fitting significant level-2 predictors into the level-2 equations with the regression coefficients of the level-1 predictors as the dependent variables. This procedure was only applied for those level-2 equations with significant level-1 predictors that also had a significant variance component in level-2. For the four communication media, a total of 34 cross-level interaction terms had been tested. Only three of them were significant and they were all in the analysis with the written communication as the dependent variables. For simplicity reasons, they were not reported in the results section.

Appendix A

The Scenarios in the Survey [a, b]

Message Polarity

He/She has done a poor job and should improve timely.

He/She has done a good job and should be encouraged.

Communication Orientation

You intend to deliver the message accurately.

You intend to deliver the message concerning the recipient's feelings.

Hierarchy

The recipient is a subordinate and the message is related to a project that he/she is involved.

The recipient is a peer colleague and the message is related to a project that he/she is involved.

Message Equivocality

The message mainly contains data figures.

Part of the message may require elaborations.

Social Influence

Some of your colleagues prefer to use electronic mail.

Most of your colleagues prefer to use electronic mail.

a. Each factor contained two conditions thus it made up a total of thirty-two possible scenarios.
b. There were two random sequences in listing the thirty-two scenarios in the survey and there were also two sequences in arranging the order of sentences in each scenario. Altogether four versions of the surveys were produced.

Appendix B

Scales Used in the Survey Questionnaire

Perceived Usefulness of Media (7-Point Scale)

Regarding face-to-face / telephone / electronic mail / written communication, please rate the following:

1. It would enable me to accomplish tasks more quickly.
2. It would improve my job performance.
3. It would enhance my effectiveness on the job.

Perceived Richness of Media (7-Point Scale)

Regarding face-to-face / telephone / electronic mail / written communication, please rate the following:

1. It enables to give and receive timely feedback.
2. It enables to tailor messages to personal requirements.
3. It enables to communicate a variety of different cues (such as emotional tone, attitude or formality) in the messages.
4. It enables to use rich and varied language in the messages.

Communicating Formality (7-Point Scale)

1. I am more cautious in words when using text-based channel than face-to-face in communication.
2. I think agreement in black and white is more powerful than verbal agreement.
3. In my opinion, it is easier to overthrow my saying from a conversation than my statement put in black and white.

Appendix C

Sub-Models in the HLM Analysis

Null Model. This is the model in which no level-1 or level-2 predictors were fitted into the equations. The equations are written in the following:

$$\text{Level 1: } Y_{ij} = \beta_{oj} + r_{ij}$$

$$\text{Level 2: } \beta_{oj} = \gamma_{oo} + u_{oj}$$

For the level 1 equation, Y_{ij} is the dependent variable at the ith repeated measure of the jth individual where r_{ij} is the error term of level-1. The intercept β_{oj} is the mean of the jth individual. For the level-2 equation, γ_{oo} is the mean of all j individuals and u_{oj} is the error term for β_{oj}. By assessing the final estimation of the variance components, it was able to judge the amount of variances across the two levels respectively. The amount of variances in level-2 also signifies the differences exist between individuals and indicates the appropriateness to treat the data set in a hierarchical sense.

Means-as-Outcome Model. At this stage a number of level-2 predictors (W_j) are fitted into the level-2 equation as follows.

$$\text{Level 1: } Y_{ij} = \beta_{oj} + r_{ij}$$

$$\text{Level 2: } \beta_{oj} = \gamma_{oo} + W_j + u_{oj}$$

A reduction of the amount of variances, which is indicated by the reduction of deviance (D) value from the HLM output, shows that those predictors can predict between-subject variances. Deviance in HLM has a comparable status of R Square in regression showing model fitness. Applying this model can be treated as controlling other variables before entering the variables manipulated in the scenarios that are the focus of the study.

Intercept-and-Slope–as-Outcomes Model. There are two stages in this step. At the first stage, the within-subject variables (X_j) were fitted in the level-1 equation. At level-2, new equations were formed for β_{ij} from each of the new level-1 predictors in

addition to the intercept term β_{oj} as follows.

$$\text{Level 1:} \quad Y_{ij} = \beta_{oj} + \beta_{ij}X_{ij} + r_{ij}$$

$$\text{Level 2:} \quad \beta_{oj} = \gamma_{oo} + W_j + u_{oj}$$

$$\beta_{ij} = \gamma_{i0} + W_j + u_{ij}$$

In the second stage, level-2 predictors which had a significant effect were fitted in the equations to explore whether a cross-level interaction exists. This process is done only for β_{ij} which has significant effect in predicting Y_{ij}. The reason of doing this is to achieve a parsimonious final model.

Table 1

Mean Scores for Ratings on the Communication Media

Media	Overall Mean of Scenario Ratings	Perceived Medium Usefulness	Perceived Medium Richness
Face-to-face	5.7	5.3	6.3
Telephone	4.4	4.8	5.4
Electronic Mail	5.0	5.0	4.0
Written	3.3	3.5	3.5

Table 2

Within-Subject Regression Analysis Results and Directions of Significant Coefficients

	Scenario Variables									
Media	Message Polarity		Communication Orientation		Hierarchy		Message Equivocality		Social Influence	
Face-to-face (161[a])	56[b]		15		55		31		9	
	21[c]	35[d]	7	8	52	3	1	30	7	2
Telephone (170)	49		16		44		35		6	
	5	44	7	9	8	36	2	33	5	1
Electronic Mail (173)	59		26		25		38		43	
	0	59	25	1	13	12	37	1	2	41
Written (153)	28		23		25		25		11	
	3	25	19	4	20	5	21	4	5	6

a - Number of regression equations formed

b - Number of significant regression coefficients

c - Regression coefficient with negative directions

d - Regression coefficient with positive directions

* All scenario variables were dummy coded with two levels

Table 3

HLM Results Using Face-to-Face as the Dependent Variables

	Model		
	1	2	3
Grand Mean (γ_{00})	5.70	5.74	5.83
Within-Subject Variable			
Message Polarity, γ_{10}			0.08
Communication Orientation, γ_{20}			-0.01
Hierarchy, γ_{30}			-0.42***
Message Equivocality, γ_{40}			0.23***
Social Influence, γ_{50}			-0.09***
Between-Subject Variable			
Perceived Medium Usefulness (PMU), γ_{01}		0.27***	0.19**
Perceived Medium Richness (PMR), γ_{02}		0.36***	0.38***
Business sector (BS), γ_{03}		-0.07	-0.07
Communication Formality (CF), γ_{04}		-0.06	0.01
Eng. Oral/Written Skill (ES), γ_{05}		0.01	0.01
Chin. Oral/Written Skill (CS), γ_{06}		0.07	0.04
English Typing Speed (ETS), γ_{07}	NA	NA	NA
Email Experience (EE), γ_{08}	NA	NA	NA
Variance Components			
Level 2			
Intercept, τ_{00}	0.84***	0.63***	0.88***
B_{1j}, τ_{11}			0.44***
B_{2j}, τ_{22}			0.07***
B_{3j}, τ_{33}			0.48***
B_{4j}, τ_{44}			0.12***
B_{5j}, τ_{55}			0.02
Level 1 (σ^2)	1.02	1.02	0.67
Model Fitness			
Deviance (D)	16651	16602	15201
ΔD from previous model		49***	1401***
Δdf from previous model		6	25

Note: * $p < .05$; ** $p < .01$; *** $p < .001$
NA = Not Applicable

Model 1: Null Model
Model 2: Means-as-Outcomes Model
Model 3: Intercept-and-Slopes-as-Outcomes Model

Table 4

HLM Results Using Telephone as the Dependent Variable

	Model		
	1	2	3
Grand Mean (γ_{00})	4.37	4.36	3.96
Within-Subject Variable			
Message Polarity, γ_{10}			0.31***
Communication Orientation, γ_{20}			0.02
Hierarchy, γ_{30}			0.30***
Message Equivocality, γ_{40}			0.27***
Social Influence, γ_{50}			-0.10***
Between-Subject Variable			
Perceived Medium Usefulness (PMU), γ_{01}		0.31**	0.32***
Perceived Medium Richness (PMR), γ_{02}		0.26**	0.30***
Business sector (BS), γ_{03}		0.02	0.02
Communication Formality (CF), γ_{04}		0.03	0.03
Eng. Oral/Written Skill (ES), γ_{05}		0.07	0.04
Chin. Oral/Written Skill (CS), γ_{06}		-0.03	-0.03
English Typing Speed (ETS), γ_{07}	NA	NA	NA
Email Experience (EE), γ_{08}	NA	NA	NA
Variance Components			
Level 2			
Intercept, τ_{00}	1.26***	1.01***	1.55***
B_{1j}, τ_{11}			0.36***
B_{2j}, τ_{22}			0.04**
B_{3j}, τ_{33}			0.35***
B_{4j}, τ_{44}			0.29***
B_{5j}, τ_{55}			0.01
Level 1 (σ^2)	1.23	1.23	0.89
Model Fitness			
Deviance (D)	17742	17703	16715
ΔD from previous model		39***	988***
Δdf from previous model		6	25

Note: *$p < .05$; ** $p < .01$; *** $p < .001$
NA = Not Applicable

Model 1: Null Model
Model 2: Means-as-Outcomes Model
Model 3: Intercept-and-Slopes-as-Outcomes Model

Table 5

HLM Results Using Electronic Mail as the Dependent Variable

	Model		
	1	2	3
Grand Mean (γ_{00})	5.03	4.86	4.69
Within-Subject Variable			
Message Polarity, γ_{10}			0.54***
Communication Orientation, γ_{20}			-0.17***
Hierarchy, γ_{30}			0.02
Message Equivocality, γ_{40}			-0.30***
Social Influence, γ_{50}			0.28***
Between-Subject Variable			
Perceived Medium Usefulness (PMU), γ_{01}		0.35***	0.37***
Perceived Medium Richness (PMR), γ_{02}		0.13	0.12
Business sector (BS), γ_{03}		0.32*	0.30*
Communication Formality (CF), γ_{04}		0.20*	0.22**
Eng. Oral/Written Skill (ES), γ_{05}		0.007	0.003
Chin. Oral/Written Skill (CS), γ_{06}		-0.009	-0.003
English Typing Speed (ETS), γ_{07}		0.01*	0.01*
Email Experience (EE), γ_{08}		0.007	0.026
Variance Components			
Level 2			
Intercept, τ_{00}	1.01***	0.68***	0.85***
B_{1j}, τ_{11}			0.66***
B_{2j}, τ_{22}			0.09***
B_{3j}, τ_{33}			0.33***
B_{4j}, τ_{44}			0.14***
B_{5j}, τ_{55}			0.09***
Level 1 (σ^2)	1.23	1.23	0.76
Model Fitness			
Deviance (D)	17710	17642	16042
ΔD from previous model		68***	1600***
Δdf from previous model		8	25

Note: *$p < .05$; ** $p < .01$; *** $p < .001$
NA = Not Applicable

Model 1: Null Model
Model 2: Means-as-Outcomes Model
Model 3: Intercept-and-Slopes-as-Outcomes Model

Table 6

HLM Results Using Written as the Dependent Variable

	Model		
	1	2	3
Grand Mean (γ_{00})	3.30	3.45	3.56
Within-Subject Variable			
Message Polarity, γ_{10}			0.23***
Communication Orientation, γ_{20}			-0.12***
Hierarchy, γ_{30}			-0.13*
Message Equivocality, γ_{40}			-0.21***
Social Influence, γ_{50}			0.01
Between-Subject Variable			
Perceived Medium Usefulness (PMU), γ_{01}		0.64***	0.60***
Perceived Medium Richness (PMR), γ_{02}		-0.03	-0.039
Business sector (BS), γ_{03}		-0.27	-0.29
Communication Formality (CF), γ_{04}		0.33*	0.29*
Eng. Oral/Written Skill (ES), γ_{05}		-0.005	0.01
Chin. Oral/Written Skill (CS), γ_{06}		-0.093	-0.10
English Typing Speed (ETS), γ_{07}		0.001	0.002
Email Experience (EE), γ_{08}		NA	NA
Variance Components			
Level 2			
Intercept, τ_{00}	2.32***	1.60***	1.99***
B_{1j}, τ_{11}	-	-	0.33***
B_{2j}, τ_{22}	-	-	0.08***
B_{3j}, τ_{33}	-	-	0.34***
B_{4j}, τ_{44}	-	-	0.22***
B_{5j}, τ_{55}	-	-	0.02*
Level 1 (σ^2)	1.03	1.03	0.74
Model Fitness			
Deviance (D)	16885	16821	15872
ΔD from previous model	-	64***	949***
Δdf from previous model	-	7	25

Note: *p < .05; ** p < . 01; *** p < . 001
NA = Not Applicable

Model 1: Null Model
Model 2: Means-as-Outcomes Model
Model 3: Intercept-and-Slopes-as-Outcomes Model

Table 7

HLM Results Using Face-to-Face Minus Written as the Dependent Variable

	Model		
	1	2	3
Grand Mean (γ_{00})	0.67	0.88	1.12
Within-Subject Variable			
Message Polarity, γ_{10}			-0.46***
Communication Orientation, γ_{20}			0.16**
Hierarchy, γ_{30}			-0.43***
Message Equivocality, γ_{40}			0.53***
Social Influence, γ_{50}			-0.37***
Between-Subject Variable			
Perceived Medium Usefulness, FTF (PMU), γ_{01}		0.25*	0.22*
Perceived Medium Richness, FTF (PMR), γ_{02}		0.40*	0.41**
Perceived Medium Usefulness, Email (PMU), γ_{03}		-0.39**	-0.39***
Perceived Medium Richness, Email (PMR), γ_{04}		-0.11	-0.14
Business sector (BS), γ_{05}		-0.40	-0.33
Communication Formality (CF), γ_{06}		-0.26	-0.20
Eng. Oral/Written Skill (ES), γ_{07}		0.01	-0.003
Chin. Oral/Written Skill (CS), γ_{08}		0.07	0.03
English Typing Speed (ETS), γ_{09}		-0.01	-0.01
Email Experience (EE), γ_{10}		-0.03	-0.08*
Variance Components			
Level 2			
Intercept, τ_{00}	2.28***	1.67***	2.16***
B_{1j}, τ_{11}	-	-	1.38***
B_{2j}, τ_{22}	-	-	0.19***
B_{3j}, τ_{33}	-	-	0.80***
B_{4j}, τ_{44}	-	-	0.35***
B_{5j}, τ_{55}	-	-	0.16*
Level 1 (σ^2)	2.67	2.67	1.70
Model Fitness			
Deviance (D)	22082	22028	20540
ΔD from previous model	-	54***	1488***
Δdf from previous model	-	10	25

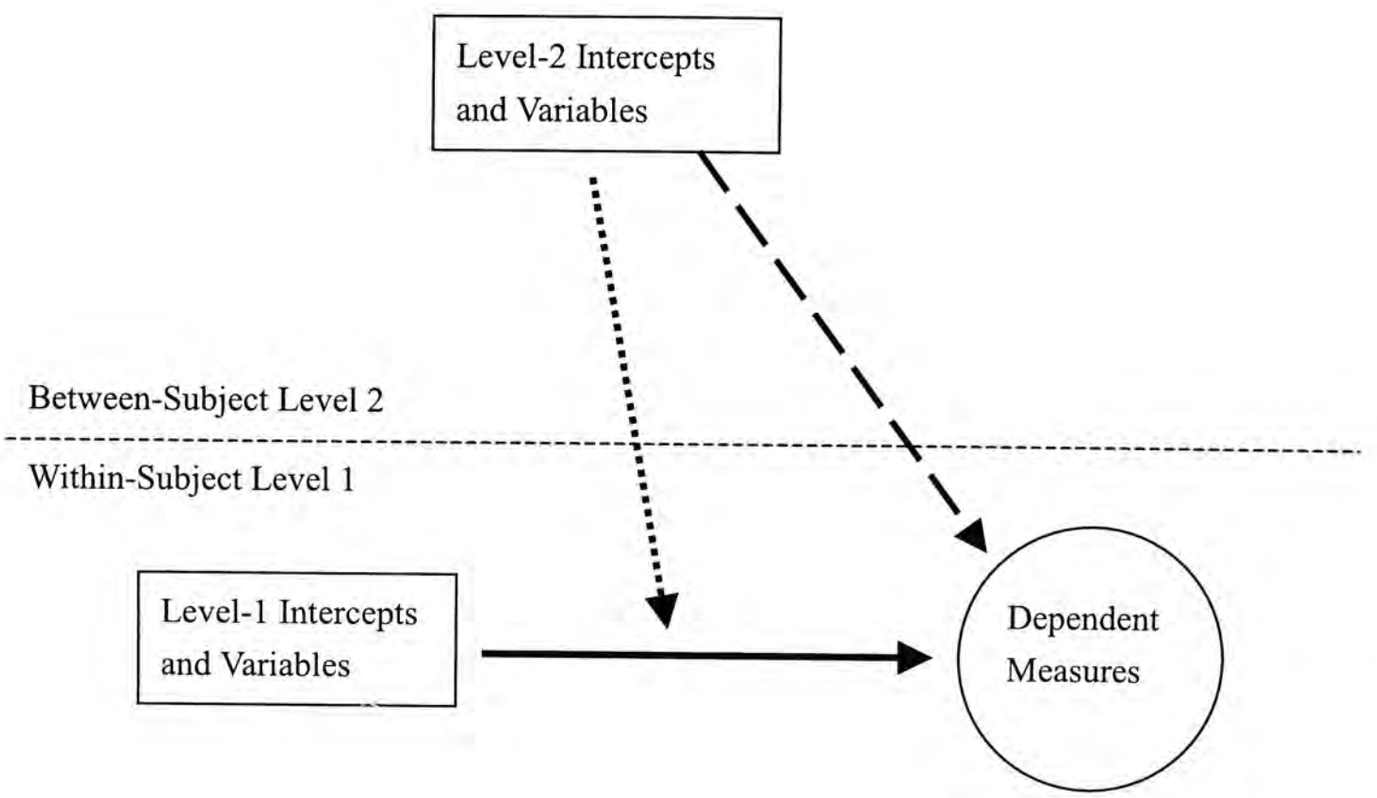
Note: *p < .05; ** p < . 01; *** p < . 001
NA = Not Applicable

Model 1: Null Model
Model 2: Means-as-Outcomes Model
Model 3: Intercept-and-Slopes-as-Outcomes Model

Figure Caption

Figure 1. HLM Approach in Dealing With Policy Capturing and Survey Data

Figure 1



Level-1 intercepts and variables as predictors

Level-2 intercepts and variables as predictors

Cross-level interactions using level-2 variables as predictors in the equations with the regression coefficients in level-1 as dependent variables